What is claimed is:

1. A method for coating ultrafine particles with a polymer, comprising:

preparing a solution of a polymer in an organic solvent;

suspending a quantity of ultrafine particles in said solution; and

combining a supercritical fluid as an antisolvent with said suspension to cause at least a portion of said quantity of suspended ultrafine particles to precipitate from said solution as polymer-coated ultrafine particles.

2. The method of claim 1, wherein said ultrafine particles comprise an active pharmaceutical compound and said supercritical fluid is carbon dioxide.

3. The method of claim 1, wherein said ultrafine particles are nanoparticles.

4. The method of claim 1, wherein said polymer content of said ultrafine particles is from 1 to 100 weight percent based on the total weight of the polymer-coated ultrafine particles.

5. The method of claim 1, wherein said polymer is selected from the group consisting of: an acrylic polymer, a polylactic acid polymer, a polylactic acid-glycolic acid polymer, and combinations thereof.

6. The method of claim 1, wherein said ultrafine particles include at least one drug, gene or bioactive agent, and wherein said quantity of precipitated polymer-coated ultrafine particles function to provide controlled release of said at least one drug, gene or bioactive agent.

7. The method of claim 1, further comprising :

flushing the polymer-coated ultrafine particles to remove any residual organic solvent therefrom.

8. The method of claim 7, wherein said supercritical fluid is supercritical carbon dioxide and wherein said flushing involves contacting said polymer-coated ultrafine particles with substantially pure carbon dioxide.

9. The method of claim 1, wherein said ultrafine particles are substantially insoluble in said organic solvent.

10. The method of claim 1, further comprising:

providing a polymer solution delivery system, an antisolvent supply system, and a high pressure vessel;

supplying said antisolvent to said high pressure vessel using said antisolvent supply system; and

delivering said polymer solution to said high pressure vessel using said polymer solution delivery system.

11. The method of claim 10, wherein said polymer solution includes at least one polymer and at least one organic solvent.

12. The method of claim 1, wherein the polymer concentration of said polymer in said solution is selected so as to minimize agglomeration of said polymer-coated ultrafine particles.

13. The method of claim 12, wherein said polymer concentration in the solvent is less than about 4.0 mg/ml.

14. The method of claim 1, wherein said precipitation of said polymer-coated ultrafine particles is effected at a pressure selected to minimize agglomeration of said polymer-coated ultrafine particles.

15. The method of claim 1, wherein said selected pressure does not function to depress the glass transition temperature of said polymer by compressing the supercritical fluid.

16. The method of claim 1, wherein said precipitation of said polymer-coated ultrafine particles is effected at a temperature selected to minimize agglomeration of said polymer-coated ultrafine particles.

17. The method of claim 16, wherein said selected temperature is less than the glass transition temperature of the polymer of the polymer.

18. The method of claim 1, wherein said antisolvent is supercritical carbon dioxide.

19. The method of claim 1, wherein said antisolvent is supercritical ammonia.

20. The method of claim 1, wherein said antisolvent is a composite supercritical fluid.

21. The method of claim 1, wherein said organic solvent is acetone.

22. The method of claim 1, wherein said supercritical fluid is combined with said suspension in two stages,

wherein a first stage comprises adding a first amount of antisolvent until saturation of said polymer in said suspension is reached, and

wherein a second stage comprises adding a second amount of antisolvent until super-saturation of said polymer in said suspension is reached or a phase transition via nucleation and precipitation of said polymer takes place on a surface of said ultrafine particles to form a polymer coating thereon.

23. The method of claim 1, wherein said ultrafine particles include at least one active pharmaceutical compound and at least one diluent or filler.

24. The method of claim 23, wherein said diluent or filler comprises from 1 to 50 weight percent of said ultrafine particles.

25. The method of claim 23, wherein said diluent or filler is selected from the group consisting of lactose, dextrose, cellulose and combinations thereof.

26. The method of claim 1, further comprising applying a force to said solution after ultrafine particles are suspended therein so as to break up agglomerates of ultrafine particles formed within said suspension.

27. The method of claim 26, wherein said force is applied by a sonicator or ultrasonicator.

28. The method of claim 1, wherein said polymer-coated ultrafine particles have application in at least one of the following applications: a pharmaceutical application, a food application, a chemical application, a pesticide application, a polymer application, coating application, a catalyst application, a conductive ink application and an energetic materials application.

29. Polymer-coated ultrafine particles produced according to a method that comprises:

preparing a solution of a polymer in an organic solvent;

suspending a quantity of ultrafine particles in said solution; and

combining said suspension with a supercritical fluid as an antisolvent to cause at least a portion of said quantity of suspended ultrafine particles to precipitate from said solution as said polymer-coated ultrafine particles.